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(54) Title: SYSTEM AND METHOD FOR INTERNET AUDIO BROWSING USING A STANDARD TELEPHONE
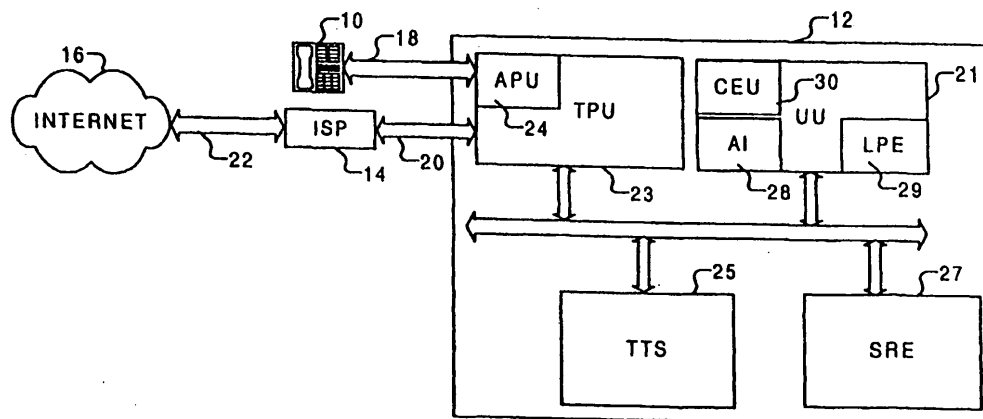
(57) Abstract

A method and apparatus for accessing Internet using voice and audio instead of a conventional visual display. POTS (Plain Old Telephone Service) can be used to access the Internet by calling an "audio" ISP (Internet Service Provider) and interacting with an Intelligent Agent. An Audio ISP uses a standard telephone (POTS, digital or analog cellular telephone, PCS telephone, satellite telephone, etc.) instead of a modem, telephone line and traditional data ISP. The Intelligent Agent (IA) takes information from the caller, accesses the Internet, retrieves the desired information and reads it back to the caller using a voice signal. The IA can surf the net by responsively interacting with the caller using voice. The IA does not need a web browser. The IA does not require any change in the current world wide web data format to support audio. The IA works with the existing web data format. Users can also access email (both send and receive) by talking and listening through the IA using POTS.

SYSTEM AND METHOD FOR INTERNET AUDIO BROWSING USING A STANDARD TELEPHONE

RELATED APPLICATIONS

The present invention claims priority to Provisional Application No. 60/121,981 filed February 27, 1999 and entitled INTERNET ACCESS USING REGULAR PHONE. This priority document is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method and apparatus for Internet access, and more particularly to accessing and navigating the Internet through the use of an audio interface via standard POTS (plain old telephone service).

Description of the related art

The number of Internet access methods has increased with the rapid growth of the Internet. World Wide Web (WWW) "surfing" has likewise increased in popularity. Surfing or "Internet surfing" is a term used by analogy to describe the ease with which a user can use the waves of information flowing around the Internet to find desired or useful information. The term surfing as used in this specification is intended to encompass all of the possible activities a user can participate in using the Internet. Beyond looking up a particular Internet resource or executing a search, surfing as used herein is intended to include playing video

games, chatting with other users, composing web pages, reading email, applying for an online mortgage, trading stocks, paying taxes to the Internal Revenue Service, transferring funds via online banking, purchasing concert or airline tickets, etc. Various kinds of web browsers have been developed to facilitate Internet

5   access and allow users to more easily surf the Internet. In a conventional web interface, a web browser (e.g. Netscape Navigator® which is part of Netscape Communicator® produced by Netscape Communications Corporation of Mountain View, CA) visually displays the contents of web pages and the user interacts with the browser visually via mouse clicking and keyboard commands. Thus, web

10   surfing using conventional web browsers requires a computer or some other an Internet access appliance such as a WB-2001 WebTV® Plus Receiver produced by Mitsubishi Digital Electronics America, Inc. of Irvine, CA.

       Recently, some web browsers have added a voice based web interface in a desktop environment. In such a system, a user can verbally control the visual web

15   browser and thus surf the Internet. The web data is read to the user by the browser. However, this method of Internet access is not completely controllable by voice commands alone. Users typically must use a mouse or a keyboard to input commands and the browser only reads the parts of the web page selected using the mouse or the keyboard. In other words, existing browsers that do allow some

20   degree of voice control still must rely on the user and visual displays to operate. In addition, these browsers require that the web data to be read aloud must be formatted in a specific way (e.g. the shareware Talker Plug-In written by Matt Pallakoff and produced by MVP Solutions Inc. of Mountain View, CA can be used with Netscape Commerce Server and uses files formatted in accordance with a file

25   format identified by the extension ".talk" (see i.e. http://www.mvpsolutions.com/PlugInSite/Talker.html which was printed on June 22, 1999 and is incorporated herein by reference.)

       Some commercially available products (e.g. Dragon Dictate® from Dragon Systems Inc. of Newton, MA) can read a web page as displayed on a conventional

30   browser in the standard web data format, however, the particular portion of the page to be read must be selected by the user either via mouse or voice commands. A critical limitation of these systems is that they require the user to visually examine

the web data and make a selection before any web data to speech conversion can be made. This limitation also exists when using these systems to surf the web. The user needs to look at the browser and visually identify the desired Uniform Resource Locator (URL) (or use a predetermined stored list of URLs) and then

5   select the desired URL by voice commands. What is needed is a means to access and surf the Internet that does not rely upon the user being able to visually perceive web data. What is further needed is a system for "audio-only" access to the Internet that does not require the authors of web pages to provide web data in specialized formats for audio play-back.

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SUMMARY OF THE INVENTION

In view of the background discussed above, it is an object of the present

15   invention to provide an improved web browser interface that: does not require the use of a computer or other Internet appliance, thus making Internet access significantly simpler by using a ubiquitous device like POTS; can interact with the user completely through audio signals using voice recognition and web data to speech conversion (i.e., without any need to visually perceive web pages); and

20   allow the use of a conventional visual browser component but with a more intelligent interface that permits audio-only control and feedback (i.e., looking at the browser is optional). Another object of the present invention is to bring Internet access to the masses of people who either cannot afford a computer or lack computer training but can use the ubiquitous POTS. Thus, the present invention

25   allows Internet browsing without requiring the substantial cost of owning and operating a computer or Internet access appliance.

In addition, since the present invention allows a user to browse the Internet with voice only, the user is thus enabled to do so while his eyes and/or hands are otherwise occupied (e.g., while driving, walking, or operating machinery). Another

30   object of the present invention is to facilitate audio-only web browsing using web data as currently formatted (i.e., the present invention does not require a change to

the existing web server data format to support audio-only browsing). Another object of the present invention is to allow access to email using POTS.

Thus the present invention provides a method of browsing the Internet comprising the steps of establishing bi-directional voice communication link with an audio Internet service provider, speaking a web surfing voice command over the bi-directional voice communication link, and then the audio Internet service provider generating a voice response representative of a World Wide Web page corresponding to the web surfing voice command. The step of generating a voice response includes the steps of translating the spoken web surfing voice command into a conventional web browser command using a speech recognition unit, retrieving Internet data responsive to the conventional web browser command, identifying portions of the Internet data useful to create an audio representation of the Internet data, and translating the identified Internet data into a computer-generated voice signal.

The present invention further includes a system for browsing the Internet comprising a telephone and an audio Internet service provider coupled to the telephone. The audio Internet service provider includes a data Internet service provider coupled to an apparatus operable to perform a selective translation function, wherein the apparatus selectively translates between voice signals and Internet data signals. The voice signals include spoken language and the internet data signals include World Wide Web pages. The apparatus operable to perform a selective translation function includes an intelligent agent that includes a speech recognition engine (SRE), a text to speech conversion engine (TTS), an understanding unit (UU) for interpreting the voice signals and processing the Internet data signals, and a transaction processing unit (TPU).

These and other features and advantages of the present invention will be understood upon consideration of the following detailed description of the invention and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 depicts a high level block diagram of an example embodiment of a
5   system for accessing the Internet using a standard telephone in accordance with
the present invention.

Figure 2 depicts a block diagram of an example embodiment of an intelligent
agent (IA) component of the system depicted in Fig. 1 in accordance with the
present invention.

10   Figure 3 depicts a block diagram of a second example embodiment of an
intelligent agent (IA) component of the system depicted in Fig. 1 in accordance with
the present invention.

Figure 4 illustrates an example embodiment of a method of accessing the
Internet using a standard telephone in accordance with the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

The present invention is preferably embodied as a computer program
20   developed using an object oriented language that allows the modeling of complex
systems with modular objects to create abstractions that are representative of real
world, physical objects and their interrelationships. However, it would be
understood by one of ordinary skill in the art that the invention as described herein
can be implemented in many different ways using a wide range of programming
25   techniques as well as general purpose hardware systems or dedicated controllers.

The present invention relates to accessing the Internet using only voice and
audio instead of conventional visual inputs and displays. A POTS (plain old
telephone service) is used to access the Internet by calling an "audio" ISP (Internet
service provider). An audio ISP includes a conventional data ISP that is buffered
30   by an apparatus capable of performing a selective translation function using
artificial intelligence methods. In the preferred embodiment of the present
invention, this selective translation function is performed by an apparatus called an

Intelligent Agent (IA) which is described in detail below. The IA translates Internet data into spoken language as well as translating spoken data and commands into Internet web surfing commands. An audio ISP uses a standard telephone (POTS, digital or analog cellular telephone, PCS telephone, satellite telephone, etc.)

5   instead of a modem, telephone line and a direct connection to a conventional data ISP. An audio ISP uses TAPI (telephony application programming interface) or a similar protocol to connect a standard telephone to a computer or other Internet appliance. The IA takes information from the caller in the form of voice commands, accesses the Internet, retrieves the desired information, and reads it back to the

10   caller using voice. Using voice input and output signals only, the caller can surf the net by interacting with the IA. The IA eliminates the need for a conventional visual web browser.

Turning now to FIG.1, an intelligent agent (IA) **12** allows a user, via a standard telephone **10**, to communicate with the Internet **16** through a conventional

15   ISP **14**. In accordance with the present invention, the IA **12** receives voice input signals **18** from the user via the telephone **10**. One of ordinary skill in the art would recognize that any number of audio-only-based bi-directional communication systems could be used in place of the standard telephone **10** including digital or analog cellular telephones, PCS telephones, satellite telephones, two-way radios,

20   etc. The IA **12** initiates an Internet session by providing a signal **20** to a conventional ISP **14**. The IA **12** can connect to the conventional ISP **14** using any number of well known methods including the use of dial-up modems, cable modems, Digital Subscriber Lines, Integrated Services Digital Networks, T1/T3 lines, Asynchronous Transfer Mode lines, local area network. high speed bus, etc.

25   The conventional ISP generates an output signal **22** to access the Internet **16** as is known in the art. A web page from the Internet **16** is sent to the IA **12** via the conventional ISP **14**. The IA **12** interprets the contents of the web page and determines which parts of the web page that need to be converted from text to speech (TTS), text table to speech, graphics to speech (GTS), or graphics to text to

30   speech (GTTTS using Optical Character Recognition (OCR) and then TTS). The IA **12** then converts the selected parts of the page to speech and sends a signal **18** containing the speech to the user via the telephone **10**. The user via the telephone

10 can continue to request other URLs. In addition, the user can interact with web pages such as search engines to locate a desired URL. The IA **12** repeats the process of getting the new web page and sending back an audio-only version to the user via the telephone **10** using, for example, a standard telephone line.

5   The IA **12** is configurable to provide a user-selectable level of detail in the audio-only version of a retrieved web page. Thus, for example, a web page containing a list of matching URLs generated by a search engine in response to a query could be read to the user in complete detail or in summary form.

         Referring now to FIG. 2, the IA **12** of Fig. 1 is described. The IA **12** provides

10   an intelligent interface between the user on the telephone **10** and the Internet **16**. In a basic preferred embodiment, the IA **12** includes a speech recognition engine (SRE) **27**, a text to speech conversion engine (TTS) **25**, an understanding unit (UU) **21** that understands both the contents of the web page and the user's spoken voice, and a transaction processing unit (TPU) **23**. While these components of the

15   IA **12** are depicted as individual hardware circuits coupled together via a single bus, one of ordinary skill in the art would understand that many different hardware architectures could be used and likewise, the entire IA **12** (or parts of it) could be implemented as software operable to run on a general purpose computer or even another data processing device.

20   The TPU **23** communicates with the user via the telephone **10** and the Internet **16** using signals **18** and **20**. The users' telephone calls are answered by the answer phone unit (APU) **24** which is preferably embodied as a telephone card or modem and is part of the TPU **23**. The TPU **23** communicates with the user via the telephone **10** using, for example, the TAPI standard, a protocol developed by

25   Microsoft Corporation of Redmond, WA that is used in connecting a telephone with a computer over a standard telephone line (see http://www.microsoft.com/ntserver/commserv/techdetails/prodarch/tapiwp.asp which was printed on June 22, 1999 and is incorporated herein by reference). In a preferred embodiment, the TPU **23** communicates with the Internet **16** via the

30   conventional data ISP **14** using: a modem and a telephone line; a cable modem and a cable line; or an Ethernet connection as is known in the art. Thus, the IA **12**

integrates a TAPI-based audio ISP with conventional data ISP using a modem or Ethernet connection.

The UU 21 is preferably implemented as a programmed computer processor including the normally associated memory and interface ports as is well known in the art. The UU 21 is operative to determine what part of a web page is graphics, what part is a dynamic advertisement, what part is an interactive program, which text is a link to a URL, etc. and makes decisions accordingly. The UU 21 is also equipped with means to understand a user's commands. The UU 21 uses a language processing engine (LPE) 29 to interpret multiple words received from the user. The UU 21 uses an artificial intelligence (AI) unit 28 that includes one or more expert systems, probabilistic reasoning systems, neural networks, fuzzy logic systems, genetic algorithm systems, and combinations of these systems and other systems based on other AI technologies (e.g., soft computing systems). In order to understand the users' commands, the UU 21 uses the SRE 27 to convert users' commands to text. Before sending the web page text to the user via the telephone 10, the UU 21 selectively converts text to speech using the TTS unit 25. The UU 21 allows the user to interact with Internet web pages by creating a complete audio representation of the web pages. Thus, if a web page includes a dynamic program such as a Java program to calculate a mortgage payment for example, the UU 21 would execute the program within the IA 12 and describe the display that would have been generated by a conventional visual browser. The IA 12 can also use the UU 21 to identify and interpret audio formatted data, including audio hyper-text mark up language (HTML) tags.

The UU 21 also includes a client emulation unit (CEU) 30 that allows the UU 21 to execute web client type programs such as Java and Java script programs that would normally execute on a user's client computer. The CEU 30 can spawn a virtual machine (e.g., a Microsoft Windows NT window), execute the client program to generate the associated displays, and pass the display data to the UU 21 to be translated and relayed to the user as described above. In this way, users are able to execute and interact with web pages that include executable programs.

FIG. 3 depicts an alternate architecture for the IA 12. The individual functional components of the IA 12 are identical to those described in Fig. 2 and as

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such the components are identified using the same reference numerals. The embodiment of FIG. 3 however provides a preferred arrangement for the functional components that allows a more optimized operation.

Turning now to FIG. 4, a flow chart depicting an example audio-only web browsing transaction using the systems illustrated in FIGS. 1, 2 and 3 is described. In steps **S1** and **S2**, a user's telephone call to the IA **12** is answered by the APU **24** within the TPU **23** as depicted in FIG. 2. After checking the user's identification and password in step **S3**, the TPU **23** asks the user for a URL to access in step **S4**. A connection to the conventional ISP **14** is then created in step **S5** using the TPU **23**. After accessing the Internet and receiving the web page in step **S6**, the web page is interpreted by the UU **21** in step **S7**. In step **S8**, the UU **21** speaks out the appropriate text of the web page to the user via the telephone **10**. Processing steps **S6** through **S8** are repeated until the user discontinues selecting links to new URLs in decision step **S9** and stops requesting additional URLs in decision step **S10**. At that point, the TPU **23** terminates the connections to both the telephone **10** and the Internet **16**.

In a preferred embodiment , the IA **12** is implemented in software and executed on a server computer. It is important to note that a user does not need a conventional visual browser because the IA **12** effectively provides an audio ISP. However, the audio ISP can be implemented using a conventional visual web browser in conjunction with the IA **12**. Alternatively, an audio ISP can use other means of accessing and retrieving web pages such as the Win32 Internet (WinInet) Application Programming Interface (API) as developed by Microsoft Corporation, described at http://pbs.mcp.com/ebooks/1575211173/ch17.htm, printed on June 22, 1999 and hereby incorporated herein by reference. One of ordinary skill in the art would further understand that the IA **12** can also be used to access, manage, compose, and send email. In other words, a user can send or receive email using voice only working through the IA **12**. Thus, a user can surf the web and can exploit all of the capabilities of the Internet, simply through human voice commands and computer generated-voice responses instead of using a visual browser running on a computer or other Internet appliance.

While the method and apparatus of the present invention has been described in terms of its presently preferred and alternate embodiments, those skilled in the art will recognize that the present invention may be practiced with modification and alteration within the spirit and scope of the appended claims. The

5　specifications and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

Further, even though only certain embodiments have been described in detail, those having ordinary skill in the art will certainly understand that many modifications are possible without departing from the teachings thereof. All such

10　modifications are intended to be encompassed within the following claims.

CLAIMS

What is Claimed is:

5   1. A system for browsing the Internet comprising:

a telephone; and

an audio Internet service provider coupled to the telephone.

2. The system of claim 1 wherein the audio Internet service provider includes a
10   data Internet service provider coupled to an apparatus operable to perform a

selective translation function, wherein the apparatus selectively translates between

voice signals and Internet data signals.

3. The system of claim 2 wherein the voice signals include spoken language and
15   the internet data signals include World Wide Web pages.

4. The system of claim 2 wherein the apparatus operable to perform a selective

translation function includes an intelligent agent.

20   5. The system of claim 4 wherein the intelligent agent includes at least one of a

speech recognition engine (SRE), a text to speech conversion engine (TTS), an

understanding unit (UU) for interpreting the voice signals and processing the

Internet data signals, and a transaction processing unit (TPU).

25   6. The system of claim 5 wherein the UU includes a language processing engine

(LPE) and an artificial intelligence (AI) unit.

7. The system of claim 5 wherein the TPU includes an answer phone unit (APU).

8. A system for browsing the Internet comprising:

means for bi-directional voice communication; and

means for providing audio Internet service coupled to the means for bi-directional voice communication.

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9. The system of claim 8 wherein the means for providing audio Internet service includes means for providing data Internet service coupled to means for performing a selective translation function, wherein the means for performing a selective translation function is operable to selectively translate between voice signals and
10   Internet data signals.

10. The system of claim 9 wherein the voice signals include spoken language and the internet data signals include World Wide Web pages.

15   11. The system of claim 9 wherein the means for performing a selective translation function includes at least one of means for performing speech recognition, means for converting text to speech, means for interpreting the voice signals and processing the Internet data signals, and means for processing user Internet surfing transactions.

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12. The system of claim 11 wherein the means for interpreting the voice signals and processing the Internet data signals includes means for processing spoken language and means for applying artificial intelligence to determine how to represent and interact with a web page using only an audio signal.

25

13. The system of claim 11 wherein the means for processing user Internet surfing transactions includes means for responding to the initialization of a bi-directional voice communication.

14. A method of browsing the Internet comprising the steps of:

establishing bi-directional voice communication link with an audio Internet service provider;

transmitting a voice signal including a web surfing voice command over the

5   bi-directional voice communication link; and

generating, by the audio Internet service provider, a voice response representative of an Internet data signal, the Internet data signal including a World Wide Web page corresponding to the web surfing voice command.

10   15. The method of claim 14 wherein the step of generating includes the step of:

performing a selective translation function to selectively translate between the voice signal and the Internet data signal.

16. The method of claim 15 wherein the step of performing a selective translation

15   function includes the steps of:

interpreting the voice signal to identify a portion containing the web surfing voice command;

performing speech recognition on the identified portion of the voice signal to determine the web surfing voice command;

20   executing the web surfing voice command and receiving the Internet data signal in response;

processing the Internet data signal to determine a set of user options;

selecting text from the Internet data representative of the set of user options; and

25   converting the selected text to speech.

17. The method of claim 16 wherein the step of processing the Internet data signal includes the step of applying artificial intelligence to determine how to represent and interact with a web page using only an audio signal, and

30   wherein the step of interpreting the voice signal includes the step of applying artificial intelligence to identify the portion containing the web surfing voice command.

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18. The method of claim 16 wherein the step of processing the Internet data signal includes the step of applying artificial intelligence to determine how to represent and interact with a web page using only an audio signal, and

5   wherein the step of performing speech recognition includes the step of applying artificial intelligence to determine the web surfing voice command.

19. The method of claim 14 wherein the step of establishing bi-directional voice communication link includes the step of responding to the initialization of a bi-

10   directional voice communication.

20. The method of claim 14 wherein the step of generating includes the steps of:
          translating the voice signal into a conventional web browser command using a speech recognition unit;

15   retrieving Internet data responsive to the conventional web browser command;
          identifying portions of the Internet data useful to create an audio representation of the Internet data; and
          translating the identified Internet data into a computer generated voice

20   signal.

21. The method of claim 20 wherein the step of translating the voice signal - includes translating a spoken email program voice control command and data, and
          wherein the step of translating the identified Internet data includes the step

25   of translating an email message into a computer generated voice signal.

22. The method of claim 20 wherein the step of translating the identified Internet data into a computer generated voice signal is performed by at least one of a text to speech converter, a graphics to speech converter, and a text table to speech

30   converter.

23. A computer accessible medium including a computer executable program, the program implementing a method comprising the steps of:

establishing a bi-directional voice communication link between a user and an audio Internet service provider;

5   receiving a voice signal including a web surfing voice command over the bi-directional voice communication link; and

generating, by the audio Internet service provider, a voice response representative of an Internet data signal, the Internet data signal including a World Wide Web page corresponding to the web surfing voice command.

10

24. The method of claim 23 wherein the step of generating includes the step of:

performing a selective translation function to selectively translate between the voice signal and the Internet data signal.

15   25. The method of claim 24 wherein the step of performing a selective translation function includes the steps of:

interpreting the voice signal to identify a portion containing the web surfing voice command;

performing speech recognition on the identified portion of the voice signal to
20   determine the web surfing voice command;

executing the web surfing voice command and receiving the Internet data signal in response;

processing the Internet data signal to determine a set of user options;

selecting text from the Internet data representative of the set of user options;
25   and

converting the selected text to speech.

26. The method of claim 25 wherein the step of processing the Internet data signal includes the step of applying artificial intelligence to determine how to represent and interact with a web page using only an audio signal, and

wherein the step of interpreting the voice signal includes the step of applying
5   artificial intelligence.

27. The method of claim 25 wherein the step of processing the Internet data signal includes the step of applying artificial intelligence to determine how to represent and interact with a web page using only an audio signal, and
10   wherein the step of performing speech recognition includes the step of applying artificial intelligence.

28. The method of claim 23 wherein the step of establishing bi-directional voice communication link includes the step of responding to the initialization of a bi-
15   directional voice communication.

29. The method of claim 23 wherein the step of generating includes the steps of:
translating the web surfing voice command into a conventional web browser command using a speech recognition unit;
20   retrieving Internet data responsive to the conventional web browser command;
identifying portions of the Internet data useful to create an audio representation of the Internet data; and
translating the identified Internet data into a computer generated voice
25   signal.

30. The method of claim 29 wherein the step of translating the web surfing voice command includes translating a spoken email program voice control command and data, and
30   wherein the step of translating the identified Internet data includes the step of translating an email message into a computer generated voice signal.

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31. The method of claim 29 wherein the step of translating the identified Internet data into a computer generated voice signal is performed by at least one of a text to speech converter, a graphics to speech converter, and a text table to speech converter.
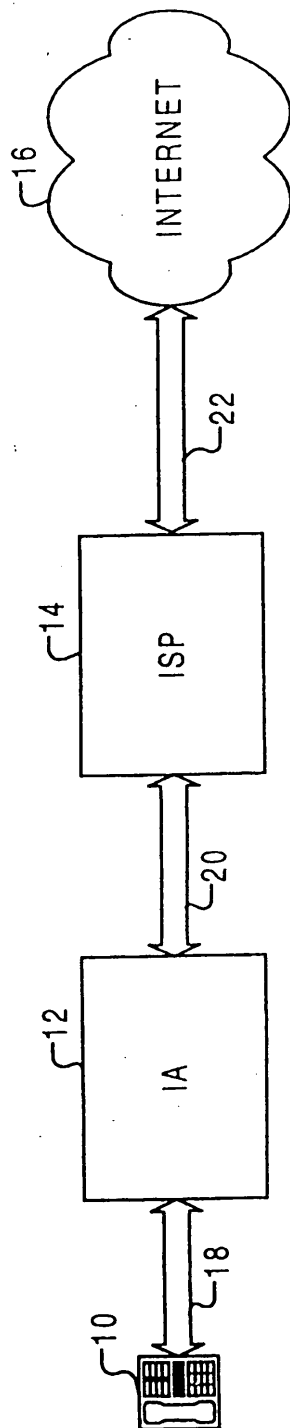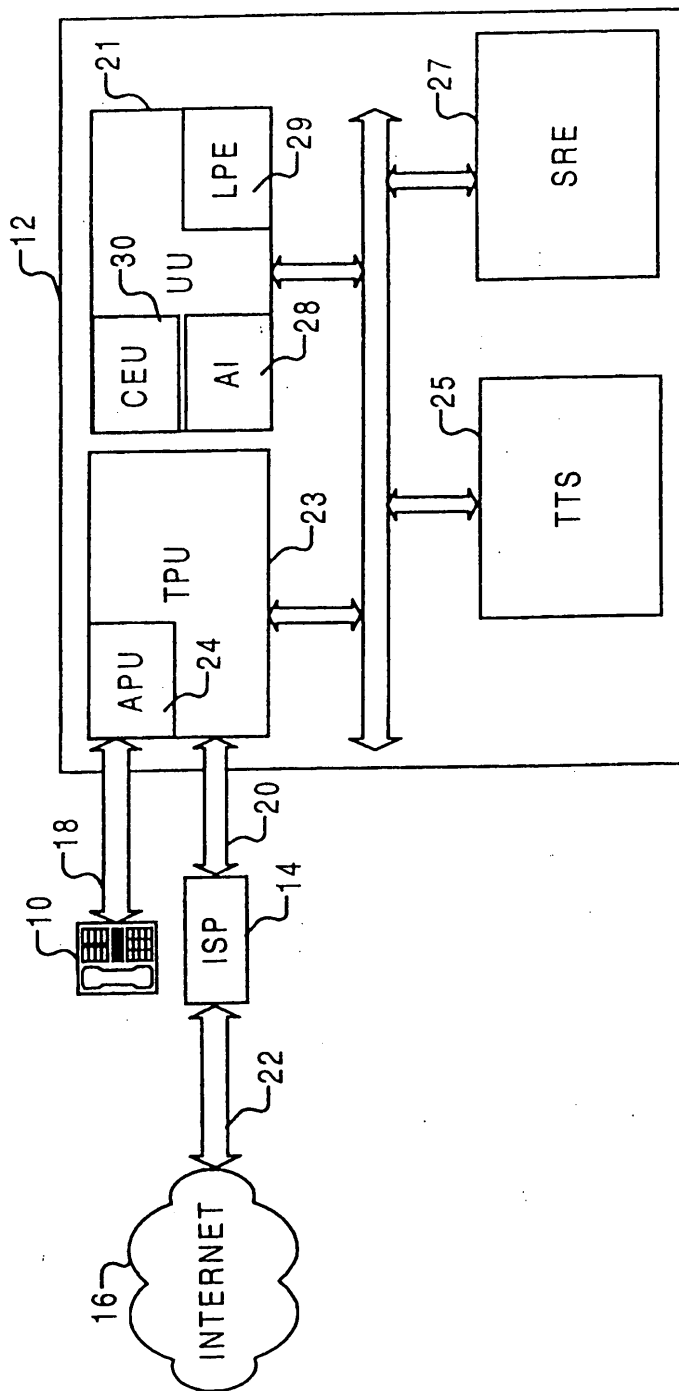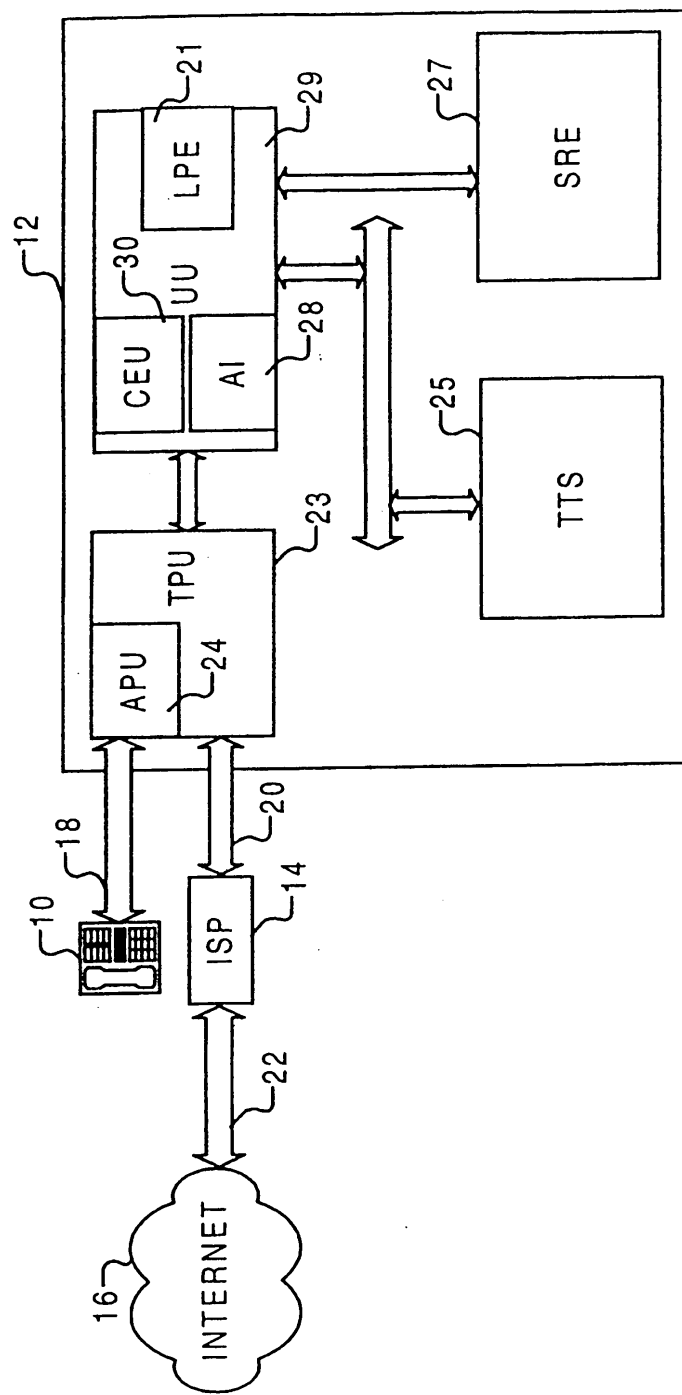
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16

INTERNET

22
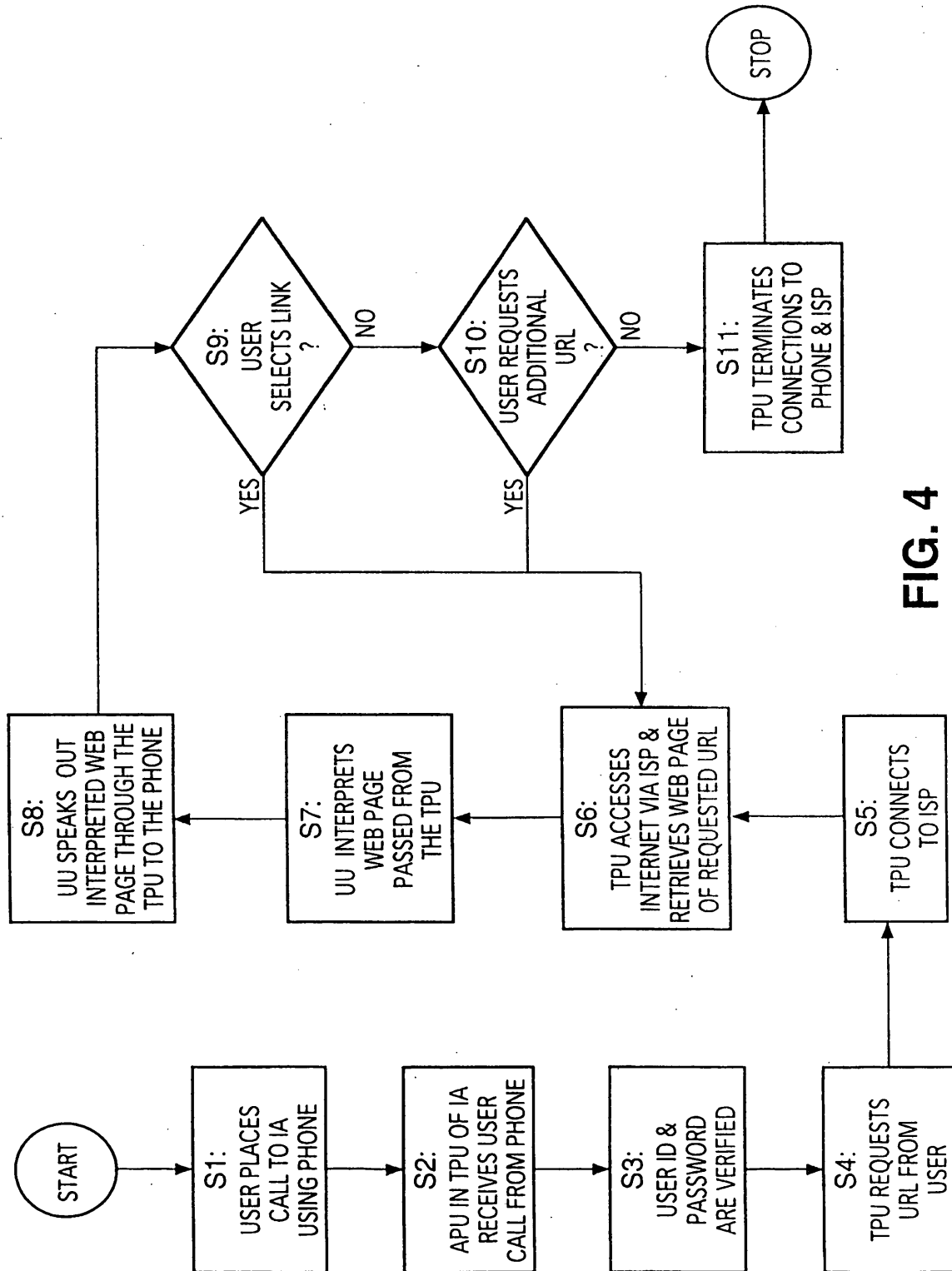
14

ISP

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12

IA

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18

FIG. 1

FIG. 2

FIG. 3

FIG. 4

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04M3/493

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7   H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 307 619 A (POLLITT ALEXANDER JAMES) 28 May 1997 (1997-05-28) the whole document	1-31
X	ATKINS D L ET AL: "INTEGRATED WEB AND TELEPHONE SERVICE CREATION" BELL LABS TECHNICAL JOURNAL,US,BELL LABORATORIES, vol. 2, no. 1, 21 December 1997 (1997-12-21), pages 19-35, XP000659566 ISSN: 1089-7089	1-20, 22-29,31
Y	the whole document	21,30

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| X | Further documents are listed in the continuation of box C. | | X | Patent family members are listed in annex. |

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 June 2000	19/06/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016	Megalou, M

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	PAGE J H ET AL: "THE LAUREATE TEXT-TO-SPEECH SYSTEM - ARCHITECTURE AND APPLICATIONS" BT TECHNOLOGY JOURNAL,GB,BT LABORATORIES, vol. 14, no. 1, 1 January 1996 (1996-01-01), pages 57-67, XP000554639 ISSN: 1358-3948 page 59, paragraph 4 -page 60, paragraph 4	21,30
X	WO 98 35491 A (JOHNSTON ROBERT DENIS ;BRITISH TELECOMM (GB)) 13 August 1998 (1998-08-13) page 1, line 24 -page 4, line 8 figures 1-3	1-20, 22-29,31
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1

INTERNATIONAL SEARCH REPORT

information on patent family members

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